District of Columbia Department of Transportation

Anacostia Maintenance & Operations Facility

CONCEPT DESIGN

SUBMISSION TO:

National Capital Planning Commission

ZGF Architects | HDR Program Management Team

APRIL 2014

Table of Contents

Planning and Design

During early 2012, the District Department of Transportation (DDOT) and the Streetcar Program Management Team (PMT) worked with District and Federal agencies (including DC Department of General Services, DC Office of Planning, State Historic Preservation Office, National Capital Planning Commission and the U.S. Commission of Fine Arts) to define infrastructure design guidelines for the DC Streetcar System Car Barns:

- Design of buildings for DC Streetcar System should be sensitive to specific site context and in support of planning initiatives.
- Design of building should be of highest aesthetic quality and should promote a vision for progressive, sustainable transportation and civic presence.
- Educational opportunities for a transit and building program should be considered in design of the site and building. This may include, but are not limited to: provision of exterior and interior public viewing areas, building transparency, efficient land use, reduction of parking.
- Sustainable design features of building and site (energy, lighting, water management and landscape) should support a healthy work environment, be visible to the general public, and provide multiple benefits.
- Safety and security considerations, including fencing and lighting, for both building operations and adjacent conditions should be integral to the design approach.
- Public art should be integrated with site and building design.
- Sensitive design of site infrastructure (such as OCS pole layout) is required.

In response to site analysis and an understanding of the programmatic requirements, guidelines for the Anacostia Maintenance and Operations Facility (MOF) were specifically developed:

- Because the narrow project site is situated between two different scales of high traffic roads, South Capitol Street and the Anacostia Freeway (295), the overall design of the building should be comfortably and clearly viewed at varying speeds up to 50-60 miles per hour.
- The building materials should be utilitarian and durable to withstand both programmatic and environmental conditions, while also elegant.

The following design narrative is provided to complement the design submission materials:

Design Process

During the conceptual design process, the design team presented a progression of building and site response ideas in workshops with the U.S. Commission of Fine Arts, National Capital Planning Commission, DC Office of Planning, and DC Department of Transportation. The workshops addressed design elements including but not limited to building massing and programmatic organization, incorporation of site elements in architectural responses, environmental conditions as design stimuli, and architectural materials. The process began with four architectural concepts each responding to the constrained site in different ways. The four were then narrowed down to two schemes that both incorporated a unified building form housing two distinct programmatic elements while creating a presence along the freeway. From the two schemes, one was selected for further development and submission in this design package.

Building Program, Massing, and Materials

The MOF program consists of two discrete components – light vehicle maintenance including a wash track and office space, which also contains an employee break room and locker rooms. The two program components have been divided into adjacent but distinct building forms in order to emphasize the separate building entrances for people and vehicles. The lower office bar with main employee and visitor entrance is along South Capitol Street in response to the slightly lesser traffic patterns. The taller and longer maintenance bar with streetcar entry/exit on both ends of the building is along 295, providing the opportunity for an expansive artistic architectural expression along the freeway.

A significant architectural gesture of the MOF is the opposing monolithic sloping green roofs that are visible from both the roadways and the neighboring buildings at higher elevations. The green roofs offer a continuous landscaped surface on a site where limited on-grade vegetation is possible. Also important to the design is the expressed vertical structure on the exterior of the building which relates to the rhythm of the poles for the streetcar overhead contact system.

The building materials have been selected for their durability and compatibility with the programmatic use. The metal panel walls carry a horizontal grain to emphasize the expanse of the building along the freeway. An undulating perforated metal screen wall shields the freeway from the wash track and introduces a kinetic quality to the architecture in response to the surroundings.

Site and Landscape

The MOF site is located for optimal visibility being in a high traffic corridor and southeast gateway into Washington, DC. In addition, its neighbors are Bolling Air Force Base and the U.S. Coast Guard.

Along with the adjacent roadways, the existing below grade utilities present site constraints for building and landscape development. Substantial sewer lines run parallel to both South Capitol Street and 295 along the western and eastern site boundaries, to constrain the buildable area to within a few additional feet off of the limit of work line.

The landscape proposal for the site compliments the elegant design of the buildings, while allowing for observation at high speeds from adjacent roadways. On the upper roof, curving geometry and a graphic planting scheme draw attention to the site, echoing the curves of the metal screen and the streetcar tracks. On the lower roof, taller green grasses blow in the wind and provide a simple contrast to the upper roof. Along the eastern edge of the site, ornamental grasses frame the building and create movement along 295 while maintaining sight lines. In addition to the green roof, the design supports site sustainability with low-maintenance native plantings for bioretention and flowering trees to shield the western sun and allow for outdoor gathering.

Sustainability

The MOF is designed to meet, at a minimum, LEED Silver criteria. The sustainable strategies implemented are:

- Two extensive green roofs
- Radiant heating in the floor of the maintenance facility
- Water reuse at the streetcar wash track
- Daylighting via skylights above the maintenance bays and clerestories along the extents of the building perimeter
- Potential on site wind energy harvesting

Daylighting is a critical element in the design for both employee productivity and optimal building performance of the MOF. Approximately 75 foot-candles (fc) are required for light maintenance task lighting and the current design is accounting for 25 fc from daylighting. The extensive daylight analysis performed during the design process included glazing type evaluation, clerestory and skylight right-sizing exercises, and energy savings calculations.

Conclusion

The MOF concept design intends to exceed the basic design criteria of a streetcar maintenance and operations facility by promoting visible sustainable site and building features and offering a strong architectural expression to the adjacent context.


SITE


View of site looking south


View from South Capitol Street looking south


View of temporary maintenance facility on site looking north

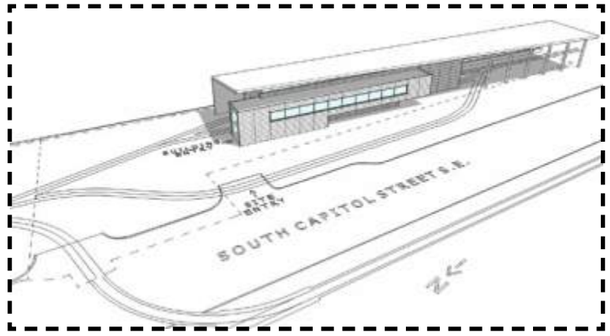

View of site looking north

Design Process

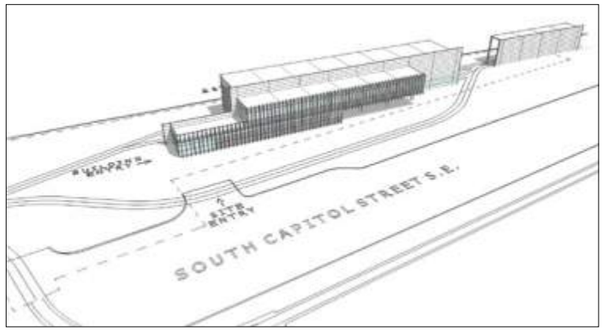
During the conceptual design process, the design team presented a progression of building and site response ideas in workshops with the U.S. Commission of Fine Arts, National Capital Planning Commission, DC Office of Planning, and DC Department of Transportation. The workshops addressed design elements including but not limited to building massing and programmatic organization, incorporation of site elements in architectural responses, environmental conditions as design stimuli, and architectural materials. The process began with four architectural concepts each responding to the constrained site in different ways. The four were then narrowed down to two schemes that both incorporated a unified building form housing two distinct programmatic elements while creating a presence along the freeway. From the two schemes, one was selected for further development and submission in this design package.

Preferred scheme(s)

Workshop #1 December 19, 2013

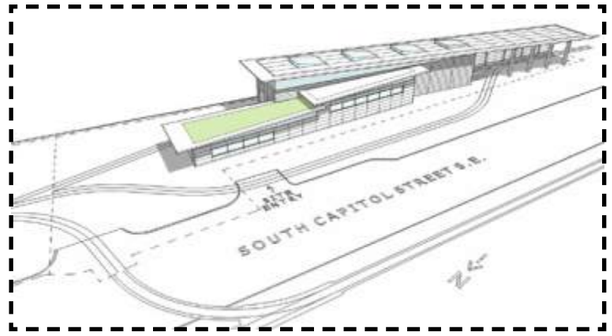


Scheme 1 “Wrapper”



Scheme 2 “Billboard”

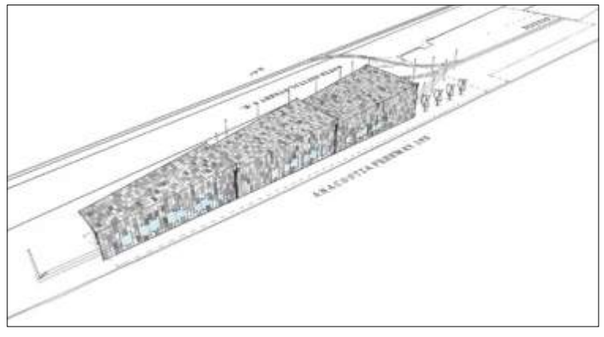
Scheme 3 “Viewing Wedge”



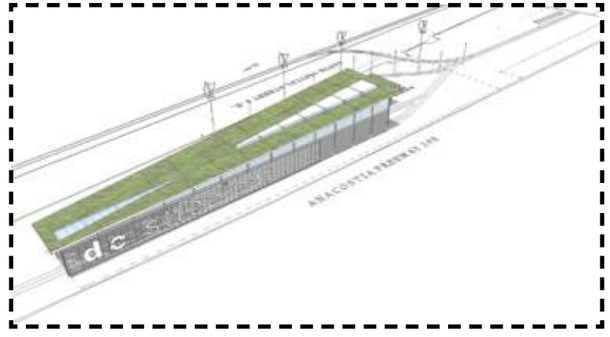
Scheme 4 “Sloped Roofs”

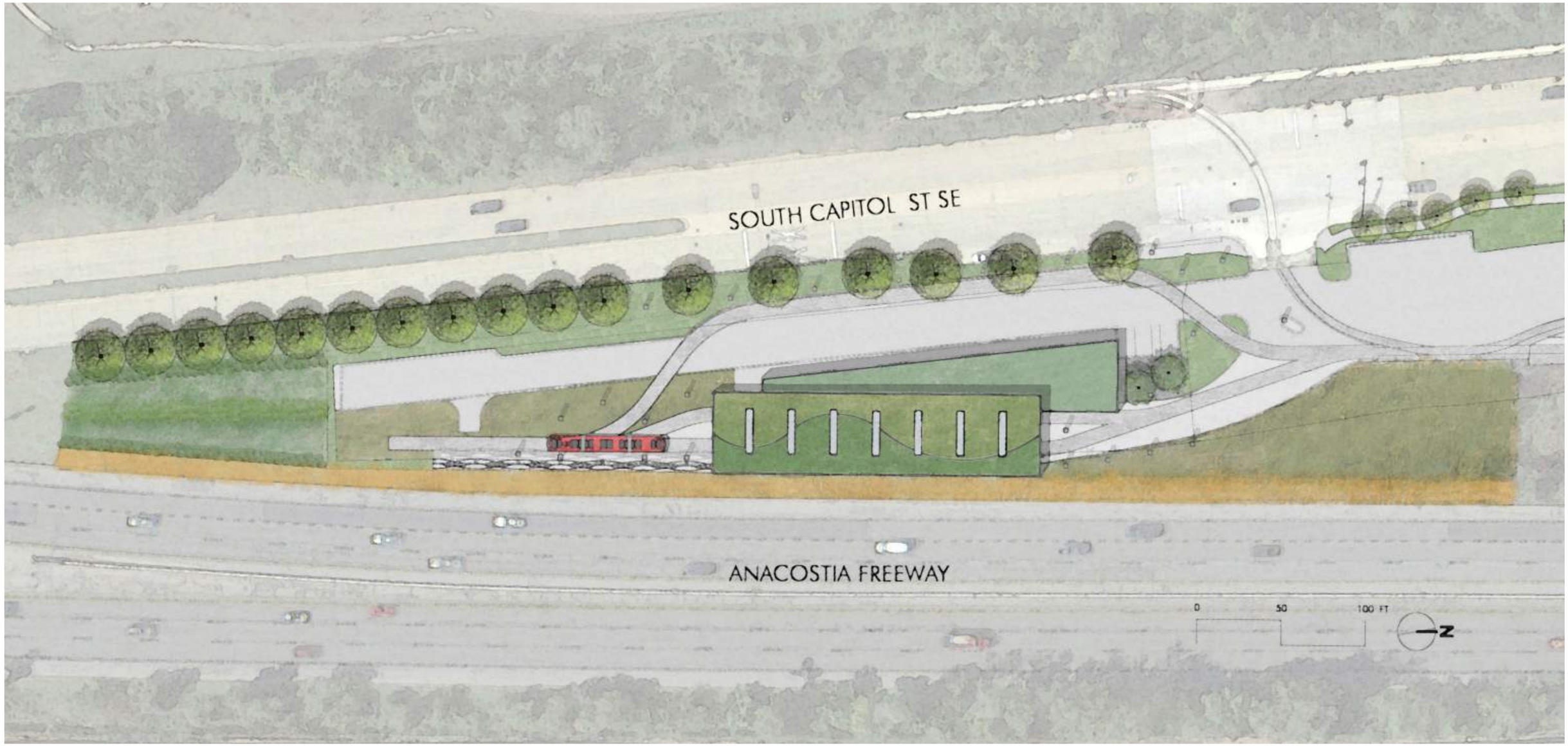
Workshop #2 January 28, 2014

Scheme 1 “Wrapper”



Scheme 2 “Sloped Roofs”




SOUTH CAPITOL ST SE
ANACOSTIA FREEWAY
0
50
100 FT
N

P1 Karl Foester Grass
(Calamagrostis x acutiflora 'Karl Foerster')

P2/P3 Little Bluestem
(Schizachyrium scoparium)

P4 Soft Rush *(Juncus effusus)*

P5 Sweet box
(Sarcococca hookerana var. humilis)

P6 Bearberry *(Arctostaphylos alpina)*

LS1 Inkberry holy *(Ilex glabra)*

SS1 Winterberry holly *(Ilex verticilata)*

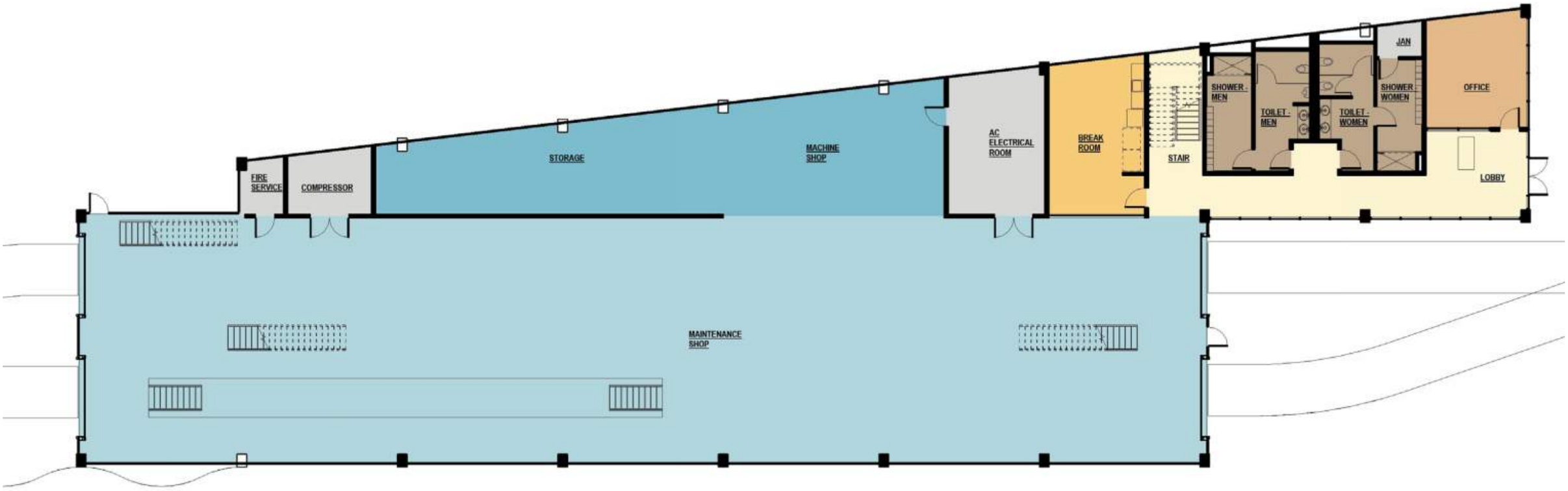
SS2 Summersweet *(Clethra alnifolia)*

MS Kelsey's Dwarf Red
(Osier Dogwood - Cornus sericea 'Kelseyi')

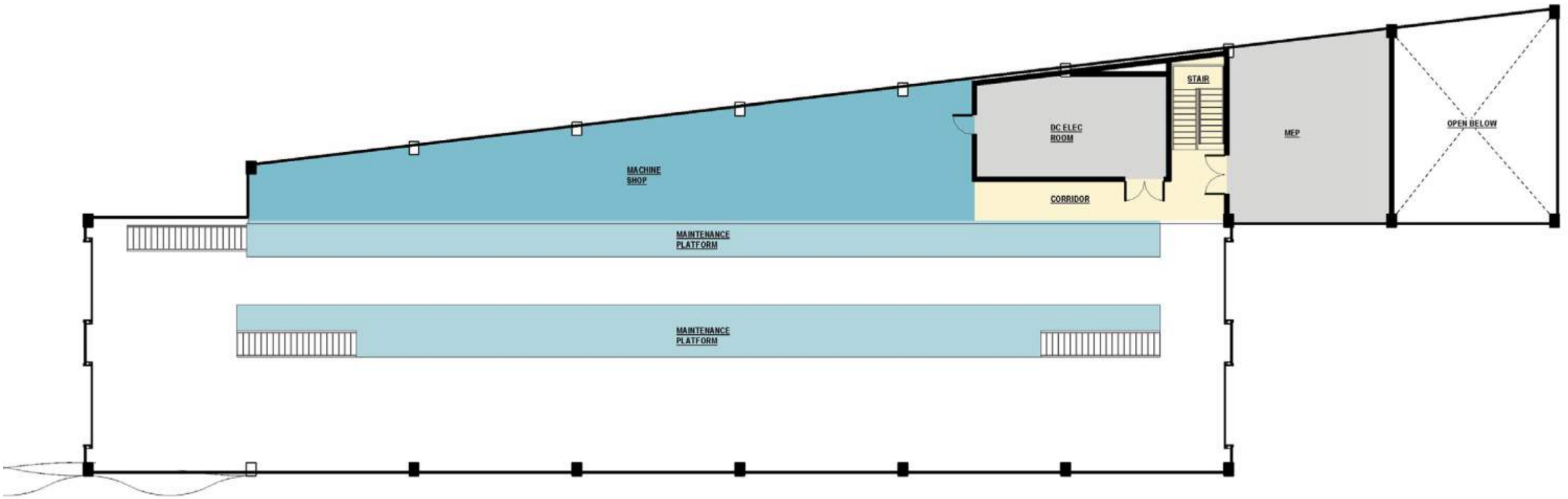
G1 MIX

G2 MIX

G3 MIX



Level One Floor Plan



Level Two Floor Plan

View from 295 looking south

View from 295 looking north

View from South Capitol Street looking north

View from South Capitol Street looking north (street trees removed from rendering for view of building)

View from South Capitol Street looking south

View from South Capitol Street looking south (street trees removed from rendering for view of building)

West Elevation

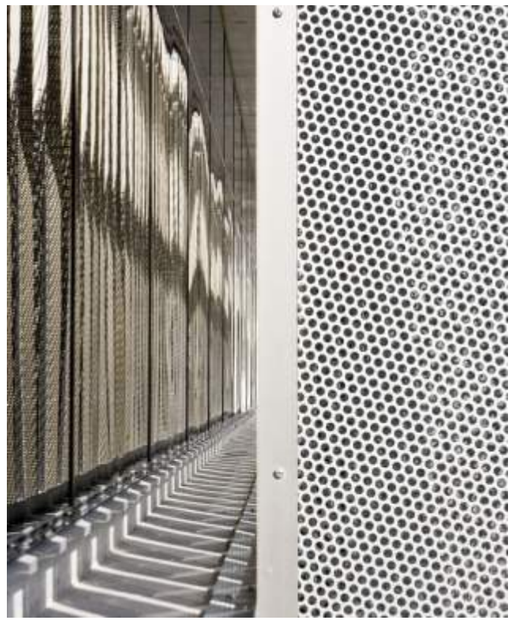
East Elevation

North Elevation

South Elevation

Metal panel of varying horizontal pattern dimensions

Translucent glass panels at clerestory



Undulating perforated metal panel screen wall at wash track

Green roofs with patterned plantings

Anacostia
Daylight Factor- Translucent Skylights

70% VLT **Translucent** Skylights +
70% VLT Translucent Clerestories

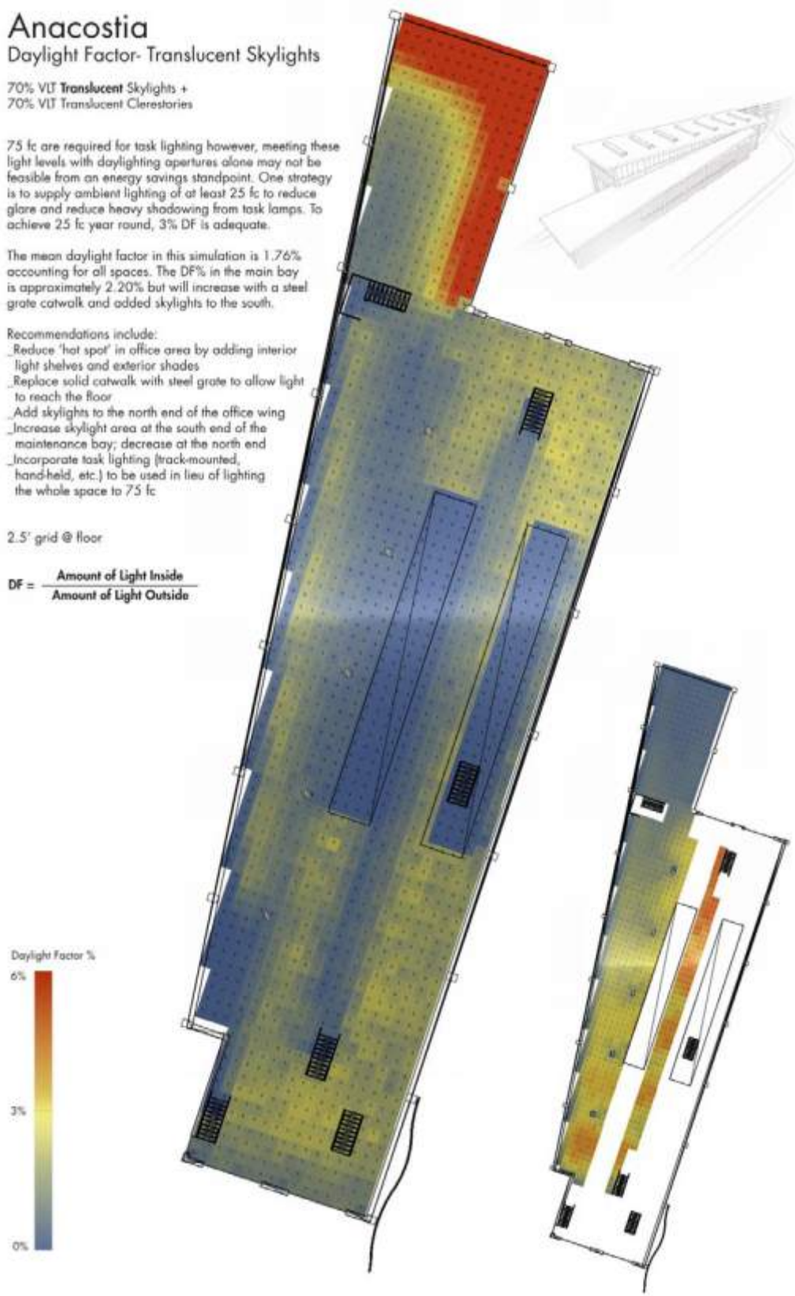
75 fc are required for task lighting however, meeting these light levels with daylighting apertures alone may not be feasible from an energy savings standpoint. One strategy is to supply ambient lighting of at least 25 fc to reduce glare and reduce heavy shadowing from task lamps. To achieve 25 fc year round, 3% DF is adequate.

The mean daylight factor in this simulation is 1.76% accounting for all spaces. The DF% in the main bay is approximately 2.20% but will increase with a steel grate catwalk and added skylights to the south.

Recommendations include:
- Reduce 'hot spot' in office area by adding interior light shelves and exterior shades
- Replace solid catwalk with steel grate to allow light to reach the floor
- Add skylights to the north end of the office wing
- Increase skylight area at the south end of the maintenance bay; decrease at the north end
- Incorporate task lighting (track-mounted, hand-held, etc.) to be used in lieu of lighting the whole space to 75 fc

2.5' grid @ floor

$$DF = \frac{\text{Amount of Light Inside}}{\text{Amount of Light Outside}}$$



Anacostia
Lighting Savings- Translucent Skylights

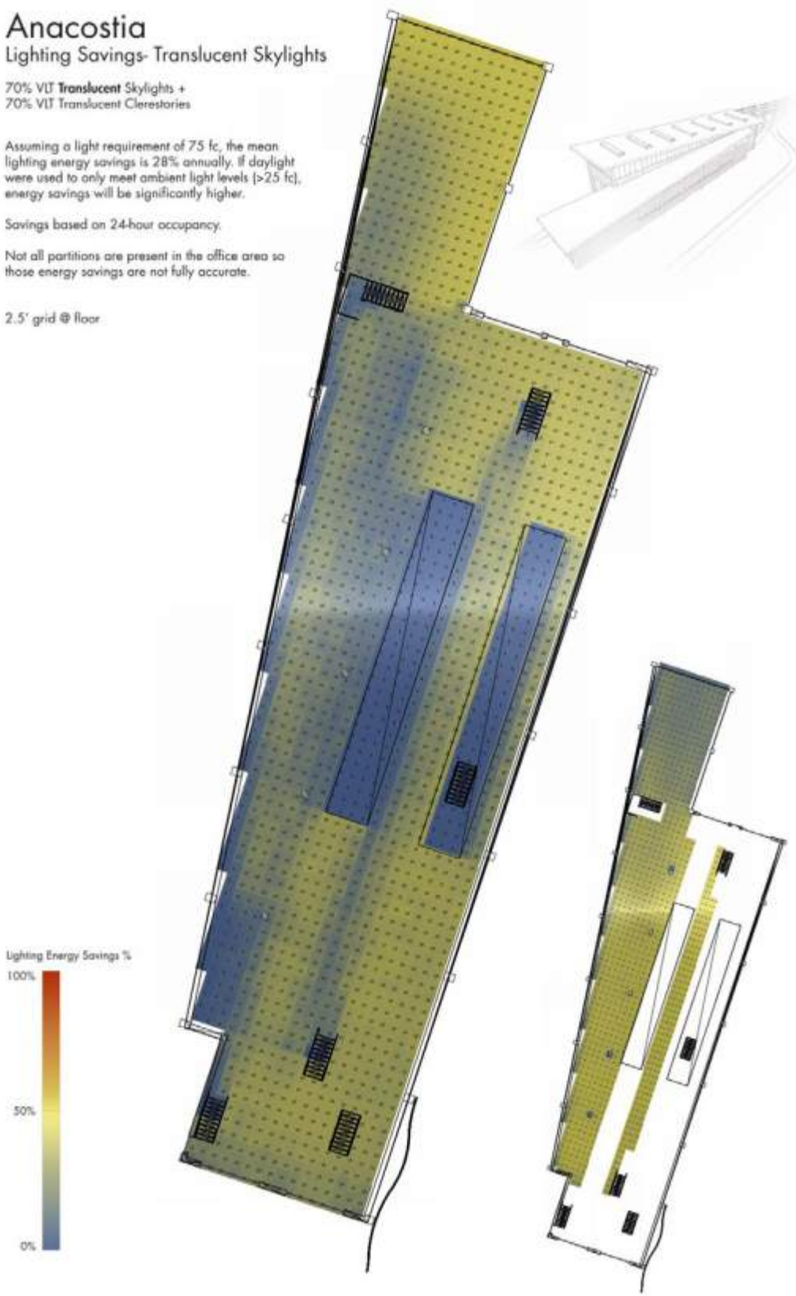
70% VLT **Translucent** Skylights +
70% VLT Translucent Clerestories

Assuming a light requirement of 75 fc, the mean lighting energy savings is 28% annually. If daylight were used to only meet ambient light levels (>25 fc), energy savings will be significantly higher.

Savings based on 24-hour occupancy.

Not all partitions are present in the office area so those energy savings are not fully accurate.

2.5' grid @ floor



LEED v4 for BD+C: New Construction and Major Renovation
Project Checklist

DDOT - Anacostia MOF
4/1/2014

Y	?	N					
1			Credit 1 Integrative Process		1		
3	2	27	**Location and Transportation**	Possible Points:	16	COST	COMMENTS
		16	Credit 1 LEED for Neighborhood Development Location		16		
1			Credit 2 Sensitive Land Protection		1		Previously Developed Site
		2	Credit 3 High Priority Site		2		
		5	Credit 4 Surrounding Density and Diverse Uses		5		
2	1	2	Credit 5 Access to Quality Transit		5		4 Bus lines + Planned Streetcar within 1/4 mile of site
		1	Credit 6 Bicycle Facilities		1		No access to bicycle network
	1		Credit 7 Reduced Parking Footprint		1		
		1	Credit 8 Green Vehicles		1		
7	3	0	**Sustainable Sites**	Possible Points:	10	COST	COMMENTS
Y			Prereq 1 Construction Activity Pollution Prevention		Required		
1			Credit 1 Site Assessment		1		
	2		Credit 2 Site Development--Protect or Restore Habitat		2		
	1		Credit 3 Open Space		1		
3			Credit 4 Rainwater Management		3		Potential green roof and/or on site bioretention
2			Credit 5 Heat Island Reduction		2		
1			Credit 6 Light Pollution Reduction		1		
7	3	1	**Water Efficiency**	Possible Points:	11	COST	COMMENTS
Y			Prereq 1 Outdoor Water Use Reduction		Required		
Y			Prereq 2 Indoor Water Use Reduction		Required		
Y			Prereq 3 Building-Level Water Metering		Required		
2			Credit 1 Outdoor Water Use Reduction		2		DDOT has not interest in irrigation
4	1	1	Credit 2 Indoor Water Use Reduction		6		
	2		Credit 3 Cooling Tower Water Use		2		
1			Credit 4 Water Metering		1		
13	12	5	**Energy and Atmosphere**	Possible Points:	33	COST	COMMENTS
Y			Prereq 1 Fundamental Commissioning and Verification		Required		
Y			Prereq 2 Minimum Energy Performance		Required		
Y			Prereq 3 Building-Level Energy Metering		Required		
Y			Prereq 4 Fundamental Refrigerant Management		Required		
3			Credit 1 Enhanced Commissioning		6		
8	6	4	Credit 2 Optimize Energy Performance		18		
	1		Credit 3 Advanced Energy Metering		1		
	2		Credit 4 Demand Response		2		
1	2		Credit 5 Renewable Energy Production		3		Potential for wind generation through grant
1			Credit 6 Enhanced Refrigerant Management		1		
	1	1	Credit 7 Green Power and Carbon Offsets		2		Is DDOT interested in purchasing green power
2	7	4	**Materials and Resources**	Possible Points:	13	COST	COMMENTS
Y			Prereq 1 Storage and Collection of Recyclables		Required		
Y			Prereq 2 Construction and Demolition Waste Management Planning		Required		
	3	2	Credit 1 Building Life-Cycle Impact Reduction		5		Option 4 - LCA
	1	1	Credit 2 Building Product Disclosure and Optimization - Environmental Product Declarations		2		
	1	1	Credit 3 Building Product Disclosure and Optimization - Sourcing of Raw Materials		2		
	2		Credit 4 Building Product Disclosure and Optimization - Material Ingredients		2		
2			Credit 5 Construction and Demolition Waste Management		2		
8	6	2	**Indoor Environmental Quality**	Possible Points:	16	COST	COMMENTS
Y			Prereq 1 Minimum Indoor Air Quality Performance		Required		
Y			Prereq 2 Environmental Tobacco Smoke Control		Required		
1	1		Credit 1 Enhanced Indoor Air Quality Strategies		2		
2	1		Credit 2 Low-Emitting Materials		3		
1			Credit 3 Construction Indoor Air Quality Management Plan		1		
	1	1	Credit 4 Indoor Air Quality Assessment		2		
	1		Credit 5 Thermal Comfort		1		
1	1		Credit 6 Interior Lighting		2		
2	1		Credit 7 Daylight		3		
1			Credit 8 Quality Views		1		
		1	Credit 9 Acoustic Performance		1		
3	3	0	**Innovation**	Possible Points:	6	COST	COMMENTS
2	3		Credit 1 Innovation		5		
1			Credit 2 LEED Accredited Professional		1		
1	3	0	**Regional Priority**	Possible Points:	4	COST	COMMENTS
1			Credit 1 Regional Priority: Specific Credit		1		
	1		Credit 2 Regional Priority: Specific Credit		1		
	1		Credit 3 Regional Priority: Specific Credit		1		
	1		Credit 4 Regional Priority: Specific Credit		1		
45	39	39	**Total**	Possible Points:	110		

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 11(

District of Columbia Department of Transportation

Anacostia Maintenance & Operations Facility

CONCEPT DESIGN

SUBMISSION TO:

National Capital Planning Commission

ZGF Architects | HDR Program Management Team

APRIL 2014